

REMARKS

This application was filed with 22 claims. Claims 1-22 have been rejected. Claims 2, 5, 16, and 17 have been canceled. Claims 1, 3, 4, 6, 7, 14, 15, 19, 20, and 22 have been amended. Therefore, Claims 1, 3-4, 6-15, and 18-22 are pending in the Application. Reconsideration of the application based on the remaining claims as amended and arguments submitted below is respectfully requested.

Claim Rejections - 35 U.S.C. § 112

Claims 7-13 and 22 have been rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the enablement requirement. Specifically, the Office Action states that "the specification does not describe the limitation of copying the training information from the receiver descrambler to a training scrambler having an output functionally linked to the channel equalizers." Applicant respectfully traverses this rejection.

With regard to this rejection, representative Claim 7 provides for "...copying the detected sequence of symbols as contents of the first descrambler to a training scrambler such that the training scrambler is driven by the known sequence of symbols..." The Specification states how this is done beginning on page 15, line 1, noting specifically at lines 7-11 as follows:

"The system knows what sequence of training symbols is being transmitted because the polynomials used in the scrambler 204A are known. Once the equalizer makes enough correct decisions (determined by the bit length of the descrambler), the information from the descrambler is forced into the scrambler." (emphasis added)

The only difference in terminology is that the claims use the word "copying" to a scrambler while the text of the specification uses the phrase "forced into the scrambler." The equivalence of this terminology would be recognized by and obvious to a person of ordinary skill in the art. In addition, the flow chart of Fig. 7 clarifies this issue further by explicitly reciting the claimed step as follows: "Copy Descrambler delay line contents to Scrambler." If the Examiner would prefer, Applicant would consent to an amendment to the Specification by substituting the phrase "copied to" for "forced into" in the text passage quoted above from page 15 of the Specification. Given the explanation stated above, and as supported by the flow chart of Fig. 7, such an amendment would not constitute new matter.

Applicant respectfully requests that the rejection of Claims 7-13 and 22 under 35 U.S.C. §112, first paragraph, be withdrawn.

Claim Rejections - 35 U.S.C. § 102(b)

Claims 1-6, 10-13, 15, 16, 20, and 21 have been rejected under 35 U.S.C. § 102(b) as being anticipated by Cupo et al., U.S. Patent No. 5,163,066. In response, Applicant has cancelled Claims 2, 5, and 16. Applicant has also amended Claims 1, 3, 4, 6, 15, and 20.

A feature common to each of the embodiments disclosed by Cupo et al. is that the training symbols used to update the coefficients of each of the receiver equalizers are the same. (See col. 2, lines 30-44 and col. 3, lines 24-29 and lines 63-67.) Therefore, Cupo et al. teaches that the training symbols used to train both

equalizers can be known (Fig. 2) or unknown (Fig. 3 or Fig. 4) but that they are identical. The Office Action on page 4 acknowledges this teaching of Cupo et al. The Office Action notes on page 5 that Cupo et al. teaches using “different streams of training sequence to train different channels”, citing col. 3, lines 51-55 and col. 5, lines 25-57. However, the cited text merely discusses two different embodiments of Cupo et al., one of which uses “ideal data symbols” for training and the other of which uses “actual data symbols.” In either embodiment, the same data symbols are used to train both equalizers. The use of different reference signals (Fig. 3, elements 212, 213) by Cupo et al. occurs during updating of the equalizers. Cupo et al. does not disclose or suggest transmitting different training symbols on each loop to train the equalizers. Claims 4, 15, and 20 have been amended to include the limitation that the B channel training data is derived from and different from the A channel training data. Using different training data for each loop facilitates estimation and reduction of the effects of cross-talk between the wire pairs in the system. (See page 13, lines 8-20 of Applicant’s Specification). As noted above, Cupo et al. does not disclose such a feature. Therefore, Claims 4, 7, 15 and 20 as amended should be allowable over Cupo et al. Claim 6 as amended is dependent on Claim 4, Claims 10-13 are dependent on Claim 7, and Claim 21 is dependent on Claim 20 and should therefore be allowable over Cupo et al.

Regarding the rejection of Claims 1 and 3, Claim 1 has been amended to provide that the A channel equalizer is initially trained using decision directed training. The sequence of training symbols are then detected at the output of a first

descrambler coupled to the A channel receiver. The detected training symbols are then copied to a training scrambler. The output of the training scrambler is then use to train the A and B channel equalizers using table directed training. In other words, the equivalent of a table is generated by the training scrambler in conjunction with a mapper. (See components 304 and 306 on Applicant's Figs. 3 and 5). Cupo et al. does not teach using the training symbols to initially train one equalizer (using decision directed training), copying the detected training symbols to a training scrambler, then using the output of the training scrambler to train both equalizers using table directed training. Rather, Cupo et al. simply teaches using decisions from one of the receivers to directly train both equalizers. Therefore, Claim 1 (as amended) and Claim 3 which has been amended to be dependent on Claim 1 should be allowable over Cupo et al.

Applicant respectfully submits that the rejection of Claims 1, 3, 4, 6, 10-13, 15, 20, and 21 under 35 U.S.C. § 102(b) should be withdrawn.

Claim Rejections - 35 U.S.C. § 103

Claims 7, 8, 14, 17-19, and 22 have been rejected under 35 U.S.C. § 103 based on Cupo et al. in view of Gonikberg, U.S. Patent No. 6,618,451. Claim 17 has been cancelled. Claims 7, 14, and 19 have been amended to include the limitation that the training data sequences sent to the A and B channel receivers are different. As demonstrated above, Cupo et al. does not disclose or suggest a step of sending different sequences of training symbols or data to the A and B channel receivers

during a training mode. Cupo et al. only teaches that either known or unknown symbols can be used but in either case, they are identically sent to each receiver during training. Gonikberg does disclose a linear equalizer but not in the context of training A and B channel equalizers in a dual-duplex communications system. Therefore, Claims 7, 14 and 19 as amended are patentable over Cupo et al. in view of Gonikberg. Claim 8 is dependent on Claim 7 and therefore should be allowable as well. Claim 18 is dependent on Claim 15 which has been amended to include the limitation that the training data sequences sent to the A and B channel receivers are different. Therefore, Claims 15 and 18 are patentable over Cupo et al. in view of Gonikberg.

Claim 22 is similar to Claim 1 as amended in that it includes the steps of decision training the A channel equalizer, copying the contents of the A channel descrambler to a training scrambler, and using the training scrambler to train the A and B channel equalizers. As noted above, Cupo et al. does not teach these steps. Gonikberg also lacks any such disclosure. Therefore, Claim 22 should be patentable over Cupo et al. in view of Gonikberg.

Claim 9 has been rejected under 35 U.S.C. § 103 as being unpatentable over Cupo et al. in view of Gonikberg and Langberg, U.S. Patent No. 5,703,905. Claim 9 is dependent on Claim 7. As discussed above, Claim 7 has been amended to include the limitation that the training data sequences sent to the A and B channel receivers are different, a step that neither Cupo et al. nor Gonikberg teach. Langberg discloses a multi-channel timing recovery system but not does not teach

the use of non-identical training data for training A and B channel equalizers. Therefore, Claim 9 should be patentable over Cupo et al. in view of Gonikberg and Langberg.

Applicant has commented on some of the distinctions between the cited references and the claims to facilitate a better understanding of the present invention. This discussion is not exhaustive of the facets of the invention, and Applicant hereby reserves the right to present additional distinctions as appropriate. Furthermore, while these remarks may employ shortened, more specific, or variant descriptions of some of the claim language, Applicant respectfully notes that these remarks are not to be used to create implied limitations in the claims and only the actual wording of the claims should be considered against these references.


New Claims

New Claim 23 also includes the steps of transmitting a first sequence of training data on the first loop and transmitting a second sequence of training data on the second loop, the second sequence of training data being different from and derived from the first sequence of training data. As discussed above, this step is not taught or suggested by Cupo et al., Gonikberg, or Langberg.

Pursuant to 37 C.F.R. § 1.136(a), Applicant petitions the Commissioner to extend the time for responding to the January 16, 2004, Office Action for 2 months from April 16, 2004, to June 16, 2004. Applicant encloses herewith a check in the amount of \$420 made payable to the Director of the USPTO for the petition fee. The

Commissioner is authorized to charge any deficiency or credit any overpayment associated with the filing of this Response to Deposit Account 23-0035.

Respectfully submitted,



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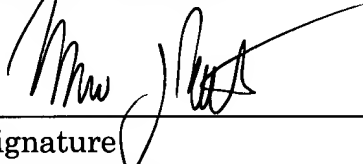
CERTIFICATE OF FIRST CLASS MAILING

I hereby certify that this Response and Amendment and check for the extension fee in the amount of \$420 are being deposited with the United States Postal Service as first class mail in an envelope addressed to:

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

on June 16, 2004.

Mark J. Patterson



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6/16/2004

Date